IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

IN RE APPLICATION OF:

YOSHIAKI YAMAMOTO

SERIAL NO. 10/535,495 GROUP ART UNIT: 1797

EXAMINER: TAIWO OLADAPO

FOR: SOLID LUBRICANT AND SLIDING MEMBER

DECLARATION UNDER 37 C.F.R. 1.132

HONORABLE COMMISSIONER OF PATENTS & TRADEMARKS

WASHINGTON, D.C. 20231

SIR:

Now comes Yoshiaki YAMAMOTO, a citizen of Japan, and a resident of c/o Fujisawa Plant, Oiles Corporation, 8, Kirihara-cho, Fujisawa-shi, Kanagawa-ken, Japan, who declares and says that:

1. I graduated from Tokai University, Faculty of Engineering in March 1991.

2. I have been an employee of Oiles Corporation since April 1991 and have been engaged in the study of solid lubricant and sliding member.

3. I am an inventor of U.S. Patent Application, Serial

No. 10/535,495.

4. I have read the Office Action dated April 14, 2009, have understood the Examiner's rejection of the invention claimed in the above application. Then, under my control, the following Experiments were carried out.

Preparation of Specimen 1:

The composition A of USP 5,173,204 was prepared as follows (the base media is a polyester resin).

<Composition>

(a) 40 parts by weight of a polyester resin ("Rigolac" 3157, produced by Showa Highpolymer Co., Ltd)

(b) 30 parts by weight of molybdenum disulphide ("Liqui Moly LM-11", produced by Daitou Co., Ltd.)

(c) 30 parts by weight of a talc ("SG-95", produced by Nippon Talc Co., Ltd.).

(d) 0.12 parts by weight of promoter for curing ("ABN-E", produced by JAPAN FINECHEM COMPANY, INC.).

First, the above talc (c) and molybdenum disulphide (b) were mixed in a mixer. Separately, the above polyester resin (a) (liquid) and promoter for curing (d) (solid) were mixed in a vessel. The above mixture of talc (c) and molybdenum disulphide (b) was introduced into the mixture polyester resin (a) and promoter for curing (d) and mixed further to obtain a composition which is substantially equal

to the composition A of USP 5,173,204.

The obtained composition was poured into the 4 holes of high strength brass fourth-class casting which was used in Example 1 of the present invention (10/535,495) and curing of the composition was conducted at 80°C for one hour in a drying oven. After cooling the test specimen to room temperature, the surface of high strength brass fourth-class casting including the cured composition surfaces was subjected to milling treatment to obtain a plane sliding surface.

Preparation of Specimen 2:

The Example 1 of USP 5,173,204 was prepared as follows (the base media is an epoxy resin).

<Composition>

(a) 40% by weight of an epoxy resin comprising a base epoxy resin ("Cemedine" 1500, produced by Cemedine Co., Ltd) and a promoter for curing ("Cemedine" 1500, produced by Cemedine Co., Ltd), whose weight ratio (base:promoter) was 1:1.

(b) 30% by weight of molybdenum disulphide ("Liqui Moly LM-11", produced by Daitou Co., Ltd.)

(c) 30% by weight of a talc ("SG-95", produced by Nippon Talc Co., Ltd.).

First, the above talc (c) and molybdenum disulphide (b) were mixed in a mixer. Separately, the above base epoxy

resin and promoter for curing (weight ratio= 1:1, both components were liquid) were mixed in a vessel. The above mixture of talc (c) and molybdenum disulphide (b) was introduced into the mixture of base epoxy resin and promoter for curing and mixed further to obtain a composition which is substantially equal to the Example 1 of USP 5,173,204 (as the media, epoxy resin was selected).

The obtained composition was poured into the 4 holes of high strength brass fourth-class casting which was used in Example 1 of the present invention (10/535,495) and curing of the composition was conducted at room temperature for over 24 hours. After curing, the surface of high strength brass fourth-class casting including the cured composition surfaces was subjected to milling treatment to obtain a plane sliding surface.

In the above preparation of specimens, since there is no concrete description for used materials in USP 5,173,204, these specimens were prepared by use of the above materials that one of the ordinary skill in the art will generally use by referring the description of USP 5,173,204. Therefore, I believe that these specimens correspond to the composition A and Example 1 of USP 5,173,204 that one of the ordinary skill in the art will generally prepare by referring the description of USP 5,173,204.

To the above obtained specimens 1 and 2, the sliding properties were evaluated by the method described in the present invention (10/535,495). Namely, the obtained test specimen was subjected to a thrust test to measure a friction coefficient and a wear amount thereof. The testing conditions are shown in Table 1.

Table 1

Material of test specimen	High strength brass fourth-class casting
Material of mating member	Stainless steel (SUS304)
Area ratio occupied by solid lubricant in sliding surface	30%
Sliding velocity	1 m/min
Load	300 kgf/cm^2
Lubrication	None
Testing time	8 hr

However, when the friction coefficient exceeded 0.35, the test stopped for protecting the testing equipment. Further, in order to enhance the reliability, the above test was conducted three times (n=1, 2 and 3) for each specimen.

The test results are shown in the following Table 2.

Table 2

	Specimen 1			Specimen 2		
	n=1	n=2	n=3	n=1	n=2	n=3
Duration cycles (cycle)[1)]	211	202	184	1120	849	812
Duration time (min.)[1)]	15	14	13	80	61	58
Friction coefficient[1)]	0.35<	0.35<	0.35<	0.35<	0.35<	0.35<
Wear amount (μm)[1)]	43	38	36	54	56	44

1) The duration cycles, duration time, friction coefficient and wear amount were measured when the friction coefficient reached to 0.35 and the test stopped.

Remarks:

In Specimen 1, the friction coefficient reached to 0.35 within very short time (13-15 minutes) and the test had to stop. Therefore, it was impossible to maintain low friction coefficient (not more than 0.100) for long time (8 hours or more).

In Specimen 2, the friction coefficient also reached to 0.35 within very short time (58-80 minutes) and the test had to stop. Therefore, it was impossible to maintain low friction coefficient (not more than 0.100) for long time (8 hours or more).

On the other hand, in the present invention (10/535,495), the friction coefficient can be maintained to

not more than 0.100 after the test for 8 hours and the wear amount small (15 μm or less) (refer to Examples of the present invention (10/535,495)).

5. I declare further that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

6. Further, deponent saith not.

Date: November 16, 2009

Yoshiaki Yamamoto

Yoshiaki YAMAMOTO